

# Secret World:

Carnivorous plants of the Howard sand sheets





*Drosera petiolaris*, courtesy Emma Lupin.

**Cover:** Detail, *U. capilliflora environs*,  
mixed medium on paper by Sarah Pirrie, 2015.



# Secret World: Carnivorous plants of the Howard sand sheets

## Introduction

It is a beautiful dry season morning. We are near the Howard River just half an hour south of Darwin in the Top End of Australia, walking through one of the most intriguing botanical landscapes imaginable.

Underfoot a sea of miniature insectivorous plants flower like small beacons. Our feet make rhythmic squelching sounds as we pick our way across the water drenched sand plain, eyes cast downward like a flock of water birds gliding over a miniature-waterlogged forest.

The group consists of scientists and artists led by Emma Lupin, Project Officer with Greening Australia and Dr Greg Leach, a botanist with more than 30 years experience in the Top End. The artists included Jasmine Jan, Jacqueline Gribbin, Winsome Jobling, Sarah Pirrie and Karen Mills.

The Howard sand sheets are right on Darwin's doorstep and so subtle they are mostly overlooked as one of the Northern Territory's most valuable and unique environmental hot spots. They are located amid a confusion of bush blocks, junkyards, agricultural plots, sand mining ventures, quad bike tracks and artesian water pumping stations that supply water to greater Darwin. Yet they contain rare and endangered species unique to the planet.

The sand sheets are just that, a deep layer of pure white sand amid savannah scrublands and monsoonal rainforests. Termites, insects and microorganisms dominate the landscape. The nutrient-poor soil creates a habitat ideal for the proliferation of bladderworts (*Utricularia spp.*). These carnivorous plants reveal themselves with delicate flowers and stems, but are driven by a submerged engine room made up of minute suction bulbs or bladders that trap insects. Tiny hair like projections at the opening of the bladder are sensitive to the motion of passing organisms. When stimulated these hairs cause the flattened bladder to dramatically inflate, sucking in water and the insect and closing a trap door behind them.

This exhibition takes you into the diminutive world of the bladderwort. It is a micro landscape, which subverts our sense of scale and draws our attention to a natural wonderland. The exhibition came about through the involvement of Dr Greg Leach and Emma Lupin from Greening Australia who has highlighted the unique and endangered nature of the region. The artists were invited to participate on the basis of their artistic practice and engagement with the natural environment.

As the curator I wanted to take the audience deep within the landscape through the eyes of five imaginative and insightful artists. So come with us on a journey into the world of the bladderwort. Shrink yourself down, imagine you are a plant living on a sheet of sand containing no nutrients. Your feet are immersed in water for six months of the year while you are surrounded by microscopic insect life, the other six months you are dry and parched under the searing sun. How do you live and survive? The answer; become an insect devouring design genius of course.

But all is not well in this finely balanced landscape. Sand mining and urban development threaten the specialist habitat in which the bladderwort thrives and survives. Continued survival of the bladderwort (*Utricularia*) species relies on human appreciation and consciousness. It is critical that as a society we know and understand the natural environment around us. These days few people seem able to identify the plant species that surround them. Instead we destroy natural habitats unaware of what they comprise, obliterating what was there before.

*Secret World: Carnivorous plants of the Howard sand sheets* highlights a unique habitat on the doorstep of Darwin. Through this exhibition we encourage greater community awareness about the beauty and wonder of the environment around us.

Angus Cameron, curator



# The Howard sand sheets:

## A hidden world of carnivorous plants and unusual species

Few people who live in Darwin, or even in the rural area realise we have a significant landscape type right on our doorstep, nestled behind rural blocks on the Howard River flood plain.

This landscape type is called the Howard sand sheets and as the name suggests has a deep layer of sand as its substrate (ranging from 2-10 metres) and very little topsoil. The area is seasonally inundated with fresh water that sits 2-10 cm above the surface of the sand at its peak, and forms subtle pools in the slightly undulating micro-topography. The surface is shaped by tiny mounds formed by a sedge like rush (*Dapsilanthus spathaceus*) and worm activity leading to the sometimes used name *Devil- devil* country.

Below the surface the hydrology is complex with water slowly moving through the sand and across the terrain during the wet season, with peak flow being between January and April. Water continues to filter through the landscape from adjoining higher woodland country well into the dry season. These particular conditions of low nutrients and shallow water flow have led to some incredibly specialised and unique species inhabiting the landscape type and filling a niche where many others cannot survive.

The sand sheet occurs in a patchwork along the Howard River catchment with the patches ranging from 80 to 300 hectares in size. They are interlinked with other vegetation types. The zone incorporating the flood plain has now been classified as a site of conservation significance, which covers 264 km<sup>2</sup> from Howard Springs to Humpty Doo, east of the Stuart Highway and incorporates 2259 hectares of sand sheet.

From afar the landscape may not look like anything special, which is why only relatively few people appreciate its uniqueness. But the environment is delicate, sensitive and complex. The upper level is often made up of sparse small trees and shrubs that tolerate wet feet including *Pandanus spiralis*, *Verticordia cunninghamii*, *Grevillea pteridifolia* and *Melaleuca nervosa*. It is down in the lower level that the treasures of the landscape are held. During the accumulation of rains during the wet season a series of small wild flowers appear like a sea of colour in the lower level; many of them are carnivorous plants and of these most are bladderworts or species of *Utricularia*. These incredible plants appear in succession over the wet season as the water levels change; each species vary in flower colour and size, some being microscopic and others having a 10cm

stem and showy flowers. All of the flowers seem to mimic insects, possibly for pollination and none have true leaves. *Utricularia* acquire their nutrients by digesting microscopic aquatic animals through their roots. The plants have developed sacs attached to their roots which have a door like mechanism which suck in the micro-organisms through a system of negative water pressure. *Utricularia* occur commonly across the Top End of the Northern Territory and 36 species are described. The Howard sand sheets is home to the greatest diversity of these plants and was even highlighted by the late Peter Taylor, expert and author on *Utricularia* globally. At the end of the wet season up to 10 species of *Utricularia* can be found occurring within a small area of the sand sheets. One of these species, *Utricularia dunstaniae* has been listed as a vulnerable on a Northern Territory level.

In addition to *Utricularia* the landscape is also unique as it supports the endangered herb *Typhonium taylori* and the Howard River Toadlet (*Uperoleia daviesae*). The Toadlet is known only from the greater Darwin region and it seems that breeding is confined to the seasonally flooded sand plains of this area. The Howard River Toadlet is small (one centimetre long) and is identified by its call at night, as it is very difficult to see.

The unique landscape of the Howard River flood plain is under threat from urban development, recreational misuse, fire and weed encroachment. The greatest pressure is from sand mining as the landscape holds a huge source of easily accessible fine high grade sand used in concrete for building, (22% of the sand sheet landscape within this region has been cleared for sand mining to date). Currently the mining industry is undergoing some changes within its procedures for mining this landscape. An Environmental Protection Authority (EPA) report has also been released this year reviewing the condition of the landscape.

We hope that this art project brings to your attention some of the botanical wonders held within the Howard sand sheets and encourages people to appreciate and visit the region when in flower. The project also highlights the importance of sitting within a landscape for longer and looking deeper, or closer into our natural environment to appreciate aspects of it from a different perspective.

Emma Lupin, Project Officer Greening Australia NT





## Howard sand sheets









## Artists and scientists in the field



Emma Lupin, Dr Greg Leach, Sarah Pirrie, Jacqueline Gribbin and Rose Cameron looking at bladderworts.





Looking at a *Utricularia dunstaniae* flower bud.

## ***Utricularia* of the Howard sand sheets**



Clockwise from top left: *U. chrysantha*, *Utricularia dunstaniae*, *Utricularia lasiocaulis*, *Utricularia holtzei*.  
Images courtesy Emma Lupin.





Clockwise from top left: *Utricularia capilliflora*, *Utricularia hamiltonii*, *Utricularia odorata*, *Utricularia leptoplecta*.  
Images courtesy Emma Lupin.

## Impact of sand mining





## Recreational impact







## Jacqueline Gribbin

While being led onto the Howard sand plains I have to admit I was mainly thinking about my trusty old Wellington boots as we squelched along a wet track of sand, water and mixed grasses through an unimposing area that so far hadn't struck me as being special in any particular way. But then we stopped and our attention was brought down to what lay beneath and hiding in plain sight. There revealed on the thinnest of stems were delicate and fragile flowers swaying back and forth in the dry season breeze.

From then on it was a case of treading carefully with not a thought of my old waterproof boots. My whole focus shifted from grass and open bush to a whole new dimension of tiny flowers that could be seen bobbing throughout the sand plains. They were accompanied by other beautiful creations, explosions of crimson lying in the water at their feet: Sundews. It suddenly became an effort to avoid stepping on them.

It is the landscape in which these little flowers, namely bladderworts, survive that captures my attention as much as the flowers themselves, as it seems to be a confusion of mud, sand, grasses, seeds, flowers and water. This landscape doesn't present itself in an obvious way with a traditional sense of perspective, unless I lie on my stomach and observe the miniature world.

But as I look at it, really look, from the side, from the top and from slanted angles, it becomes obvious this landscape is as much about what lies under the water and sand as what is above. The bladderworts are vivid and charming flowers above, but below they are minute carnivorous traps.

Creating Japanese style (water-based) woodblock prints from this wet landscape is so right for me; the technique is about the adjustment and control of water, ink and glue on blocks creating their own effect. Just as the sand sheets themselves contain many strata, the printing technique is also about creating layers. Although the watery ground may look still and quiet, take a closer – face to the water closer – look and you will see swirls and ripples and bubbles within the stillness. Then, lift your head back and you'll see the purple, yellow and white bladderwort flowers swaying in the wind amongst the grasses.





*Flight of U. Leptoplectra*, water-based woodblock print, 30.3 x 45 cm, 2015.

## Jacqueline Gribbin



*Within the Sand Sheets*, water-based woodblock print, 30.3 x 45 cm, 2015.





*Standing in Water (Utricularia dunstaniae)*, water-based woodblock print, 30.3 x 45 cm, 2015.





## Jasmine Jan

Studying the Howard sand sheet in the field for this project I felt like I was going on one of those early explorations to a foreign land to discover and record as an artist the plants, animals and landscape of this “New world”. In essence it was a “New World” for me as I had never actually visited or studied a sand sheet habitat in detail. The difference between this expedition and one of the real early explorations is that I had the advantage of having expert botanists telling me all about the hydrology, landscape and the plants that I was experiencing for the first time. They identified and described how these plants flourish in a nutrient poor habitat that is very dynamic and complex and yet extremely sensitive to interference.

What struck me most was the scale of this landscape. It was vast but not tall. It was rich with detail but not overwhelming to the eye. This sounds contradictory but until you actually walk the landscape of a sand sheet it is really hard to understand. I felt like a giant walking onto a landscape where the “trees” are less than ankle height. The canopy of this “forest” was below the height of my knees. So to actually really get to know the sand sheet you literally have to immerse yourself in this damp and soggy landscape but the rewards of getting down and dirty are abundant.

The wildlife of this landscape is also Liliputian in scale. Tiny tadpoles, occasionally a tiny freshwater fish, water beetles, ants and spiders live in this world of the sand sheet. Lacewings, dragonflies and minute flying insects move about almost undetected but if scaled to what we experience a forest as then they would be like giant pterodactyls flying overhead.

Interpreting this landscape provided me with a bit of a quandry. I could depict the Howard sand sheets from an aerial perspective, like a drone, capturing the vastness and sparseness of this complex habitat or I could capture the amazing detail as I saw it through a microscope and hand lens. With both of these perspectives somehow I felt I could not create a complete picture. So I decided that a plant inventory style approach, reminiscent of the work of the early botanists/artists who were recording the flora of a newly discovered land was the way to go. Although not truly what I would describe as complete inventory these works endeavour to capture the essence of the biota inhabiting the Howard sand sheet.





*Nymphoides spongiosa*, *Drosera petiolaris* and *Banksia dentata*, watercolour, colour pencil and graphite on 600gsm Arches hot press watercolour paper, 57 x 13 cm, 2015.



*Xyris indica*, *Utricularia odorata* and *Nymphoides subacuta*, watercolour, colour pencil and graphite on 600gsm Arches hot press watercolour paper, 57 x 13 cm, 2015.





*Utricularia hamiltonii*, *Sowerbaea alliacea* and *Utricularia leptoplectra* watercolour, colour pencil and graphite on 600gsm Arches hot press watercolour paper, 57 x 13 cm, 2015.



## Karen Mills

As an artist, I am curious about seeing and looking at the world around me. I love to observe the colours, patterns, shapes and textures in Nature that become a source of inspiration for my work.

Thus the Howard sand sheets art project was a brilliant chance to explore a part of the Darwin rural area that I had not seen up close before and to learn about the life of the unique plants that grow there.

My first impression of being on the sand sheets was one of natural beauty, peace and stillness.

A warm gentle breeze was blowing.  
The blue sky was bright and clear.  
A few clouds were building on the horizon.  
I saw a white-bellied sea eagle flying in slow circles over the woodland at the edge of the wet area.  
Checking out our human activity.

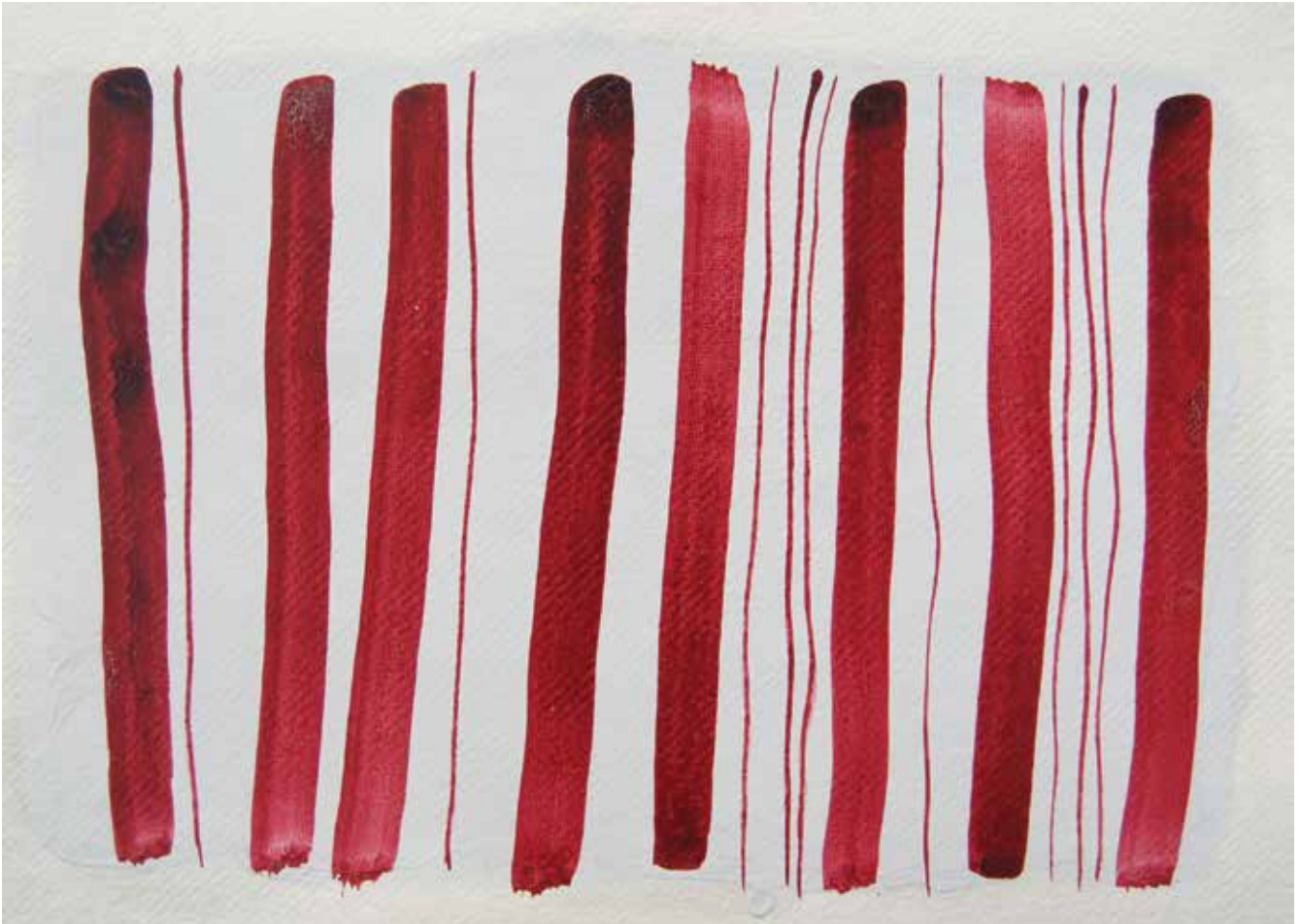
I sat quietly and listened to the country.





*White-bellied Sea Eagle*, mixed media on paper, 30 x 40 cm, 2015.

## Karen Mills



*Drosera*, mixed media on paper, 30 x 40 cm, 2015.





*Grevillea*, mixed media on paper, 30 x 40 cm, 2015.



## Sarah Pirrie

In exploring the Howard sand plains we participated in four interrelated processes (1). We considered the multiple perspectives given to this envisioning Nature: from the artists to the scientists, the sand miners to the quad bikers, all plants and animals living on the plains, and in particular the bladderworts. We thought about how each of these visions impacts on the way we name Nature, calling it a mine lease or crown land, considering it as protected habitat or recreational zone. As we visited sites and framed information through drawing, listening, discussing and documenting we processed the speed at which Nature is transformed. As a delicate ecological phenomenon the sand sheets cannot be recovered easily once destroyed; our feet squelching into the moist ground felt just as invasive as the irreversible diggers. However the other changes evident were the biological, chemical and physical transformations occurring prolifically around us as organisms grew, lived and died. Finally through the affects and effects of transforming Nature we considered the life cycle of the *Utricularia* with its specialisations for survival in the low nutrient habitats; the interconnectedness to the water table with the greater hydrology of the region and the affects mining can have on effectiveness of this process.

Back in my studio the marking of my time at the Howard sand plains was realised through a series of works which engage with the invisible, delicate distinctions that make this place so unique. Like many of my installation works I begin with water creating individual 'specimens' from pulp. The drying of this on the horizontal drop sheet evokes symmetry with the sand sheets where plants cling to the topsoil maintaining a delicate web of roots that build an island habitat. Transferring my 'collection' to the picture plane enables a refocusing on the botanical and a returning to the watery world of the carnivorous bladderworts.

1. Halsey, M. (2006). Deleuze and Environmental Damage - Violence of the Text, Ashgate Publishing Ltd.





# Sarah Pirrie



*U. leptoplectra enviros*, mixed medium on paper, 28 x 48 cm, 2015







## Winsome Jobling

The Howard sand sheets are a distinct vegetation type consisting of heathlands, open woodlands, sedges and grasses. In March the wet season has flooded these plains, leached out nutrients and clear, fresh water up to 200mm deep inundates the sand sheets. A harsh environment for plants.

*Utricularia* have adapted to the lack of nutrients by adding meat to their diets! Miniscule bladders on their roots snap up prey when sensitive bristles are triggered. Their traps are reset when they have finished eating. Aaahh the innovation of plants and the adaptiveness of the natural world...

*Utricularia* are tiny! Traipsing, gum-booted - through this already fragile environment... I was on tiptoes so as not to crush any endangered plants. Kneeling in water head down bum up like a duck I entered this tiny world, I entered this Lilliputian world of *Drosera* (carnivorous sun dews), pom pom topped sedges, miniscule broad leaf grasses and an amazing variety of *Utricularia* flowers scattered like wildflowers through this detailed microcosm of nature - reminiscent of Durer's drawing *The Great Piece of Turf*.

Winged *U. leptoplectra*, purple above yellow below, swarm like insects, *U. dunstaniae* has long horns, *U. lasiocaulis* dances in a wide mauve skirt, some have three petals and a similar plant has five. I was surprised by their diversity.

To the Larrakia the Howard Springs area is specifically valued as a freshwater catchment. The sand sheets are also recognised by PAWA as a natural wet season water filtration system feeding the Howard River and Darwin's water supply.

Rich black organic mud fringes the sand sheets. Quad bike heaven!! These deeply rutted tracks widen and encroach further for fresh adventure but they also change the water levels and the surface run-off on the sand sheets.

Lack of formal protection has put this unique ecosystem to the test by the threats of sand mining, climate change and ignorance.

I have used the fine fertile black mud in my work as a contrast to the sterile white sand...of the Utrics...





*U. leptoplectra*, drypoint on pigmented cotton pulp chin colle, 75 x 48 cm, 2015.

## Winsome Jobling



*Lurch, Howard sand sheets mud on rag paper, 42 x 30cm, 2015.*





*This fragile piece of turf (after Durer), Howard sand sheets mud and ink on rag paper, 42 x 30cm, 2015*

## Karen Mills

Karen Mills is a Palmerston based artist who works in the medium of painting and describes her art as abstract expressions of memory and landscape.

A practising artist for over fifteen years, Mills has been a finalist in the Telstra Aboriginal and Torres Strait Islander Art Award finalist three times. In 2006 she was the inaugural recipient of the Wenten Rubuntja Northern Territory Indigenous Artist Fellowship to New York. Mills has exhibited at a national and international level and her work is held in private collections in Australia and overseas.

## Winsome Jobling

Winsome Jobling was born in Sydney in 1957 and moved to Darwin in 1982 when she began experimenting with papermaking. Well known for paper installations and sculptural forms, which extend traditional notions of papermaking, Jobling has experimented with around 60 native and introduced plant species.

Jobling has exhibited nationally and internationally since 1981. Her practice is linked to the environment on both political and physical grounds. Winsome's art is tactile and sensual, often contrasting elements of texture, translucence, fragility and strength. A new development in her work incorporates watermarks in paper, which reference the sometimes hidden nature of knowledge, ownership, power and history.

## Jacqueline Gribbin

Jacqueline F Gribbin is an Australian/British national who has lived in the N.T. since 2007.

After graduating in the UK, she moved to Japan and trained as a Printer, living there for 11 years. In 2005 she was Printer-in-Residence at Singapore Tyler Print Institute and Senior Printer from 2006-2007. Jacqueline was Workshop Manager at Northern Editions Printmaking Studio for 5 years.

In 2012 she was invited to be Artist-in-Residence in Japan under a grant from the Agency of Cultural Affairs. Jacqueline collaborated with woodblock artist Ralph Kiggell in 2013 on a printmaking project with migrant children in northwest Thailand and worked with him in his studio in Bangkok in 2014. They exhibited at H Gallery in Bangkok in 'Metamorphosis and Flux: An International Exhibition on Translation', which toured to China, New Zealand and Artspace Mackay, Australia in 2015. She is currently Artist-in-Residence at Territory Wildlife Park.





## Jasmine Jan

Jasmine Jan was born and raised in Darwin. She completed her science degree whilst undertaking a traineeship in the Natural Sciences division at the Museum and Art Gallery of the Northern Territory. It was during her traineeship that Jasmine developed her skills in scientific and wildlife illustration. She is currently employed as the Artistic/Narrative officer at the Territory Wildlife Park.

In 1990 and 1992 she was awarded the Queen Elizabeth Silver Jubilee Trust fellowship and travelled to the USA to study scientific/wildlife illustration techniques with leading illustrators in Philadelphia and Maine. She has since studied with master artists and undertaken many workshops in watercolour, mixed media, pastel, graphite, coloured pencil and pen & ink. In recent years she has begun to work with kiln formed and lamp-worked glass.

Jasmine has exhibited locally, interstate and overseas and her work has been acquired by private collectors, corporate business and government institutions. She lives on a 105 acre property at Lambells Lagoon and works from her studio/gallery.

## Sarah Pirrie

Sarah Pirrie works across conceptual, site-responsive and often collaborative art practice that incorporates drawing, sculpture, installation, events and public interventions. Pirrie's work has referenced a range of social and environmental issues and is often shaped by local activity and phenomena.

Recent projects include:

2014 Temporary Territory, collaboration with Jakarta base arts collective Ruangrupa, Darwin International Festival; 2014 Terraforming, drawing exhibition, Nomad Art Gallery, Parap, NT; 2014 Runoff installation as part of 135th Meridian East curated by Andre Lawrence, Australian Experimental Art Foundation, Adelaide, SA; 2014 Low tide desiccation as part of Botanica curated by Cath Bowdler, Godinymayin Yijard Rivers Arts and Culture Centre, Katherine, NT; 2014 Made to Last- the conservation of art, Curated by Sherryn Vardy, Charles Darwin University Art Gallery, NT.

Pirrie is currently working as a Visual Arts Lecturer for Charles Darwin University, School of Creative Arts and Humanities and has contributed to a number of publications including Art Monthly Australia, Art and Australia, Artlink: Australian contemporary art quarterly, Photofile and RealTime.



## Dr Greg Leach

Greg Leach has a Ph.D. in botany and has worked across northern & central Australia and Papua New Guinea in many facets of wildlife conservation, specialising in botanical survey, plant taxonomy and ecology of tropical flora, threatened species management and sustainable wildlife use.

During 25 years with the Parks & Wildlife Service of the Northern Territory he managed the NT Herbarium and the Darwin Botanic Gardens. Most recently he was the CEO of Greening Australia NT. He has a particular interest in plant species that are threatened by activities such as habitat destruction, development or trade. Since 1997 he has worked as a plant expert with the UN Convention on International Trade of Endangered Species (CITES). A particular focus has been the determining of safe harvest limits for perennial plants. Greg also chairs the Board of the Cairns-based Australian Tropical Herbarium.

## Emma Lupin

Emma has always loved the natural environment, spending many years at sea before settling in The Northern Territory and falling in love with its landscapes.

Her focus is on environmental education, connecting people to country and appreciating its complexity and beauty as well as living more sustainably. She studied Horticulture and plantsmanship at The Royal Botanic Garden in Edinburgh and went on to specialise and work with Tropical flora. In northern Australia Emma has worked with both native and productive plants with a focus on educational gardens, urban sustainability and the production and creative use of local food. She studied a Bachelor of Environmental Science at Charles Darwin University and has been involved in scientific field work and conservation land management within the region with various organisations. Emma has worked at Greening Australia as a project officer for over two years, she also enjoys practicing art and photography.







## Angus and Rose Cameron

Angus and Rose have resided in Darwin since 1997 and have worked as artists and arts and educational managers.

Rose has worked as a community artist and was Business Manager at Northern Editions Print Studio from 1999-2002, Manager of Tiwi Art Network from 2003 -2004 and coordinator of the 2001 National Aboriginal and Torres Strait Islander Art Awards (NATSIAA). Through these positions Rose facilitated the development of exhibitions, projects, sales and marketing activities of Indigenous art and limited edition prints.

In 1997 Angus was appointed Head of Art, at Kormilda College in Darwin, subsequently he was Education Manager at the Museum and Art Gallery of the Northern Territory (MAGNT) and Industry Development Officer for the Association of Northern, Kimberley and Arnhem Aboriginal Artists (ANKAAA).



## Nomad Art Productions

In 2005 Angus and Rose established Nomad Art Productions. Through Nomad Art Angus and Rose work closely with contemporary artists, community art centres and Aboriginal corporations across the Top End and central Australia.

Nomad Art is well known for facilitating unique projects that foster cross-cultural collaborations with artists nationally. These curated exhibitions promote collaboration, reconciliation and understanding and with an educational focus.

## Acknowledgements

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Published by Angus and Rose Cameron  
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